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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,624	12/30/2003	Eric A. Jacobsen	42P16732	9861

7590 08/18/2006

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EXAMINER

CHASE, SHELLY A

ART UNIT PAPER NUMBER

2133

DATE MAILED: 08/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/749,624

Applicant(s)

JACOBSEN ET AL.

Examiner

Shelly A. Chase

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-11 and 13-23 is/are rejected.
- 7) ☒ Claim(s) 6 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

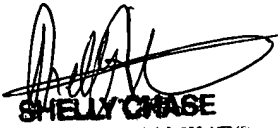
Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


SHELLY CHASE
PRIMARY EXAMINER

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4-05 & 6-04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 to 23 are presented for examination.

Information Disclosure Statement

2. The references listed in the information disclosure statement submitted on 6-18-2004 and 4-18-2005 have been considered by the examiner (see attached PTO-1449).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Lu et al. (*LDPC-based space-time coded OFDM systems over Correlated fading channels: performance analysis and receiver design*, IEEE).

Claim 1:

Lu teaches a transmitter structure of an LDPC-based STC-OFDM system, comprising: a Low-density parity-check (LDPC) encoder for encoding and disassociates data (see pg. 80 par. 2 & fig. 5) and a MPSK modulator for modulating the received encoded data (see pg. 80 par. 2). Lu also teaches that

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the system uses K subcarriers with N transmitter antennas (see pg. 75, sect. II).

Lu further teaches that the system applies another modulation scheme (MQAM) (see pg. 80 par. 3).

As per claims **2** and **5**, Lu teaches that the encoder is a LDPC encoder (see fig. 5) and the system does not use an additional interleaver (see pg. 80 par. 1).

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims **17** to **20** are rejected under 35 U.S.C. 102(a) as being anticipated by Yang et al. (*Wireless communication based on LDPC and adaptive space-time coded MQAM*, IEEE).

Claims **17** and **18**:

Yang teaches a LDPC and space-time coded OFDM system ("transceiver") comprising: a transmitter and a receiver wherein the transmitter includes LDPC encoder with disassociate properties and an adaptive MQAM modulator connected to the encoder for modulating the encoded data (see pg. 1354). Yang also teaches that the adaptive modulation is for multiple channels where bit loading is performed (see pg. 1355 sect. 2.2- 2.2.3). Yang further teaches a receiver coupled to the transmitter and multiple antennas coupled to both the receiver and transmitter (see pg. 1354).

As per claims **19** and **20**, Yang teaches that the modulator is an adaptive loading modulator for either bit or power loading (see pg. 1356 sect. 2.2.2) and that the transmitter does not include an deinterleaver (see pg. 1354 sect. 2).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3 to 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. in view of Yang et al. (*Wireless communication based on LDPC and adaptive space-time coded MQAM*, IEEE).

As per claims 3 and 4, Lu does not specifically teach that the LDPC portions includes a plurality of bit nodes to receive data and a plurality of check nodes selectively connected to the plurality of bit nodes neither teaches that the modulator implements an adaptive bit loading modulation scheme; however Yang in an analogous art teaches a LDPC and space-time coded OFDM system comprising: a LDPC system that includes a plurality of symbol nodes and a plurality of check nodes and the system uses an adaptive loading MQAM modulation (see pg. 1354-1355).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the space time coded system of Lu to include adaptive MQAM modulation as taught by Yang since, Yang teaches that bandwidth efficient transmission can be achieved by the use of adaptive modulation (see abstract). This modification would have been obvious because

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a person of ordinary skill in the art would have been motivated to employ a system of achieving bandwidth efficient transmission as taught by Yang.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. in view of Eberle et al. (*A digital 80Mb/s OFDM Transceiver IC for wireless LAN in the 5 GHz band*, IEEE).

As per claim 7, Lu teaches that the OFDM system for wireless communication includes multiple IFFT devices; however, Lu fails to specifically teach that the transmitter includes an OFDM physical interface. Eberle in an analogous art teaches an OFDM system for wireless LAN uses an OFDM modulation for the physical layer interface and that the IFFT performs OFDM modulation (see pg. 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify OFDM system of Lu to include modulating for the physical interface as taught by Eberle since, Eberle teaches that it is one of the emerging standards of broadband wireless LAN. This modification would have been obvious because a person of ordinary skill in the art would have been motivated to employ a device for achieving efficient communication in the wireless media by utilizing the standards as taught by Eberle (see pg. 1).

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9. Claims **8, 9** and **11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. in view of Han et al. (*Smart random channel access in OFDM systems by joint signal processing and packet scheduling*, IEEE).

Claim 8:

Lu substantially teaches the claimed invention. Lu teaches an OFDM system with a turbo receiver comprising: FFT devices receiving the modulated signal and a LDPC decoder coupled to the FFT devices (see pg. 81 sect. A). Lu does not specifically teach that the FFT devices are physical layer interfaces; however Han in analogous art teaches that the traditional OFDM system operates in the physical layer (see pg. 133). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the OFDM system of Lu to include implementing in the physical layer as taught by Han since, Han teaches that physical layer is one of several process for operating the OFDM system. This modification would have been obvious because a person of ordinary skill in the art would have been motivated to employ a know technique for reliable communication as taught by Han.

As per claims **9** and **11**, Lu teaches that a soft MAP_EM demodulator is coupled between the FFT devices and the LDPC decoder (see pg. 81 sect. A), Lu further teaches that the receiver does not need an interleaver (see pg. 80 par. 1).

10. Claim **10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu in view of Han et al. further in view of Yang et al..

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As per claim **10**, Lu in view of Han does not specifically teach that the demodulator implements an adaptive bit loading demodulation scheme; however, Yang in an analogous art teaches that the demodulator applies adaptive loading (see pg. 1354

11. Claims **21** to **23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al. in view of Lu et al.

Claims **21** and **22**:

Yang substantially teaches the claimed invention. Yang teaches a LDPC and adaptive spatial-sub-carrier coded modulation for OFDM wireless communication comprising: encoding the source data with a LDPC encoder (see pg. 1355 par. 2) and using a multi-input/multi-output (MIMO) system with channel state information to apply adaptive modulation using M-order quadrature amplitude modulating (MQAM) scheme (see pg. 1355 sect. 2.2.1). Although, Yang teaches a MIMO system with plural antennas, Yang fails to specifically teach that the modulation scheme is selected for the encoded information on one or more OFDM sub-carriers based on the detected channel condition.

Lu in an analogous art teaches LDPC-based space-time coded OFDM system wherein the channel state information is used in the frequency selection for identifying the channel capacity of the system (see pg. 76 sect. III). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the MIMO OFDM system of Yang to

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include selecting a frequency for better channel capacity as taught by Lu since, Lu teaches that efficient encoding is achieved with improved channel capacity when the selective frequency is applied (see pg. 78 par. 1 and pg. 87 sect. VIII). This modification would have been obvious because a person of ordinary skill in the art would have been motivated to employ a method for achieving efficient encoding and improved channel capacity for an OFDM system as taught by Lu. As per claim 23, Yang teaches that the modulator uses an adaptive MQAM modulation scheme (see pg. 1356 sect. 2.2.2).

Allowable Subject Matter

12. Claims 6 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelly A. Chase whose telephone number is 571-272-3816. The examiner can normally be reached on Mon-Thur from 8:00 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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